What is claimed is:

1. A voltage adjustment circuit for a Li-ion rechargeable battery comprising:

means for determining by a first comparison circuit whether the rechargeable battery is in a charging state, a discharging state or a stand-by state, and the first comparison circuit turns on or off a first switching element accordingly;

means for comparing by a second comparison circuit, during the battery is in a discharging state, the voltages between an input voltage and a reference voltage, and the second comparison circuit turns on or off a second switching element accordingly;

the first compassion circuit coupling to the second comparison circuit, wherein said first switching element is connected with said second switching element in parallel to create two possible passages for the input/output current;

means for protecting the battery by a protection circuit from over-charge/discharge of the battery due to any excess load current or any large short circuit current, where the protection circuit controls a third and a forth switching elements accordingly, and said third switching element is connected with said forth switching element in series, where either said third switching element or said forth switching element will be able to turn off the current passage;

a first pair of bi-directional terminals (P+, P-) are used by both charging(input) operation and discharging(output) operation; and

a second pair of terminals (C+, C-) are used to connect the Li-ion rechargeable battery.

2. The voltage adjustment circuit of claim 1, wherein said first comparison circuit is an OP AMP.

3. The voltage adjustment circuit of claim 1, where the first comparison circuit further comprises a first resistor coupling to the negative end of said second pair of terminals and said first comparison circuit; where a second resistor is coupling to the negative end of said first pair of terminals and said first comparison circuit;

said first resistor providing a first input signal and appropriate limit on current to said first comparison circuit from said first terminals; said second resistor provides second input signal and appropriate limit on current to said first comparison circuit from the battery; and

said first comparison circuit compares said first input signal with said second input signal to determine which states the circuit is in; If said first input signal is higher than said second signal, the circuit is in charging state; if said first input signal is lower than said second signal, the circuit is in discharging state; and all other cases are in stand-by state.

4. The voltage adjustment circuit of claim 1, wherein said first switching element is one of FETs in a MOSFET.

5. The voltage adjustment circuit of claim 1, wherein said second comparison circuit is an OP AMP.

6. The voltage adjustment circuit of claim 1, further comprises a third resistor a transistor, a forth resistor, a fifth resistor, where said third resistor is coupling to the positive end of said first terminals and the base of said transistor, and the emitter of said

transistor is coupling to the negative end of said first terminals; said transistor provides one of inputs into said second comparison circuit with a reference voltage at the base of said transistor, using band-gap voltage;

said forth resistor and said fifth resistor are coupling, in series, to said first terminals and divide the voltage (or divider voltage) at said first terminals to provide another input into said second comparison circuit; and

during discharging, said second switch element is controlled by said second comparison circuit to open up the current passage when said reference voltage is higher than said divider voltage , otherwise inducing a voltage drop in the current passage when said reference voltage is lower than said divider voltage.

7. The voltage adjustment circuit of claim 1, wherein said second switching element is one of FETs in a MOSFET.

8. The voltage adjustment circuit of claim 1, wherein said voltage drop is accomplished by adding at least one diode in the current passage, wherein said diode is built in a MOFET.

9. The voltage adjustment circuit of claim 1, wherein said protection circuit is a Li-ion Battery Protector.

10. The voltage adjustment circuit of claim 1, wherein said third switching element and forth switching element are two FETs (third and forth) in a MOSFET;

said protection circuit further has means for detecting an over-charge/discharge condition and provides an appropriate cut-off control signal to said third FET and forth FET;

during charging, when the battery voltage goes higher than 4.35v said protection circuit turns off said third FET to shut off the current passage; when the battery voltage comes down below 4.1v said protection circuit turns on said third FET to reconnect the current passage and resume the charging of the battery;

during discharging, when the battery voltage falls below 2.3v said protection circuit turns off said forth FET to shut off the current passage; when the battery voltage comes back up or over 2.9v said protection circuit turns on said forth FET to reconnect the current passage and resumes the discharging of the battery; and

whenever the current is over 3~5A, said protection circuit turns off either the third FET or the forth FET.

11. The voltage adjustment circuit of claim 1, further comprising a sixth resistor, a seventh resistor, a first capacitor, and a second capacitor; wherein said sixth and said seventh resistors provide appropriate signal to said protection circuit while limiting current into said protection circuit;

said first capacitor connects to the negative end of said second terminals and said sixth resistor, and said first capacitor and said sixth resistor will stabilize a supply voltage to the said protection circuit; and

said second capacitor connects to the negative end of said second terminals and said protection circuit, and sets an output delay time for over-charge detection for said protection circuit.